DOCUMENT RESUME

ED 466 150 IR 021 220

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TITLE Participant Interaction Models and Roles in a Computer Supported Collaborative Learning (CSCL) Environment: A Malaysian Case Study.

PUB DATE 2001-06-00

NOTE 7p.; In: ED-MEDIA 2001 World Conference on Educational Multimedia, Hypermedia & Telecommunications. Proceedings (13th, Tampere, Finland, June 25-30, 2001); see IR 021 194.

PUB TYPE Reports - Research (143) -- Speeches/Meeting Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.

DESCRIPTORS Case Studies; *Computer Assisted Instruction; *Computer Mediated Communication; *Cooperative Learning; Educational Technology; Foreign Countries; Higher Education; *Interaction Process Analysis; Models; Student Role; Teacher Role; Teacher Student Relationship; World Wide Web

IDENTIFIERS Malaysia

ABSTRACT

In this paper, three models of participant interactions in a Web-based instruction courses were identified among a diverse group of seven adult learners in a Course-On-Line, Masters of Instructional Technology Program at the University of Malaya (Malaysia). The three models were named the cyclical model, the hierarchical model, and the parallel model. The cyclical model depicts the interactions of the computer, instructor and the learner as in a cycle. The hierarchical model views the instructor and the computer as the participants in a level higher than the learner. The parallel model sees the learner and the instructor progressing parallel to one another mediated by the computer. The roles of the participants in the computer-supported collaborative learning (CSCL) class as perceived by the learners are also discussed. The paper concludes: it can be said that this case study has uncovered some insights into how a diverse group of adult learners perceived interactions between participants in a CSCL environment and how they utilized this dynamic interaction to construct and create knowledge out of a colossal amount of information. (Contains 22 references.) (Author/AEF)

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Participant Interaction Models and Roles in a Computer Supported Collaborative Learning (CSCL) Environment: A Malaysian Case Study

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Abstract: Three models of participant interactions in a web based instruction course were identified among a diverse group of seven adult learners in this paper. The three models were named the cyclical model, the hierarchical model, and the parallel model. The cyclical model depicts the interactions of the computer, instructor and the learner as in a cycle, the hierarchical model views the instructor and the computer as the participants in a level higher than the learner, whereas the parallel model sees the learner and the instructor progressing parallel to one another mediated by the computer. The roles of the participants in the CSCL class as perceived by the learners are also discussed.

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Introduction

Since Lev Vygotsky's introduction of the "Zone of Proximal Development" (ZPD) (1962) continuum, it has been advocated that social interactions can act as scaffolding in the construction of knowledge. Based upon this Vygotskian view of learning as social phenomena and experience, Ryder (1994) states that new knowledge is constructed by learners as they engage in dialogue. In the late eighties, there was an effort to individualize learning processes and hence the solo learner model was prevalent in the CSCL studies (Lehtinen, Hakkarainen, Lipponen, Rahikainen & Munkkonen, 1999). However this gave rise to the concern that social interaction in the CSCL environment was being omitted. The present trend in ICT is far removed from this original situation. Current theories on knowledge building emphasize the socially distributed nature of cognition especially in the CSCL environment. Distributed cognition is believed to be a process in which individual cognition is extended and stretched to accomplish and achieve something that an individual would be unable to achieve alone. According to Norman (1993), cognitive processes can also be distributed between humans and machines. Distributed cognition as stated by Salomon (1993) can form systems consisting of the individual learner, peers, instructors and cognitive tools. Cognitive tools apparently reduce cognitive processing load (Pea, 1994). Salomon (1995) envisions the computer as a trigger for a chain reaction and therefore the computer must be allowed to serve in the way it serves best that is enhancing learning from mere recitation to exploration, manipulation and creation. Crook (1994) made a distinction between interacting around and through computers. Interacting "around" computers means that computers can be considered as tools that encourage face to face communication between participants in a CSCL environment. Interacting "through" computers according to Crook (1994) means the use of networks such as the Local Area Network, the Wide Area Network, and the Internet, which has various mediating tools such as the e-mail. The e-mail for example can be used as an asynchronous or a synchronous communication tool. Koschmann, Feltovich, Myers and Barrows (1995), say that interactions in the ordinary classrooms are synchronous and sequential. According to Agostinho (1997), an example of "flexible interactivity" in a CSCL environment is, *"...how one group is able to review and participate in the dialogue of the other group. Also a member of one group can join the discussion of another group or send a message to a member in another group without disturbing the flow of discourse. The facilitators meanwhile can monitor the entire process...(p.6)"*. The scenario described would be a hard act to follow in the traditional classroom. Brna (1998) highlighted four different collaborative models in the CSCL environment that have different goals. They are (i) whether collaboration involves synchronous effort of a task or whether is the task divided into various parts and each handled by different collaborators, (ii) whether collaboration is a state or the process, (iii) whether collaboration is seen as a means to achieve some learning goal or whether the collaboration is in itself the end goal, and (iv) whether the participants in the collaboration state or process are aware of the existence of the formal contractual relationship (p.1). Laurillard (1993) in her conversational framework model put forward eight primary workflow actions that occur between the instructor, the learner and the interactive medium (the computer), which are, (i) instructor describes conception to be learned, (ii)

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learner describes the conception, (iii) instructor redescribes the conception, (iv) learner redescribes conception, (v) instructor sets up micro-world activities, (vi) learner interacts with the micro-world activities, system provides feedback, and (viii) learner modifies actions based on feedback. Lehtinen et al. (1999) reiterate that social interaction between participants makes certain that each other's viewpoints are considered. This in turn develops the participants' metacognitive skills, as they become aware of their own knowledge.

Another important factor to consider is that, in an ever-dynamic CSCL environment, the interactions among participants and their roles are beginning to take on new and unique patterns. Lerner (1997) concludes that because of the introduction of technology, the learner's role has shifted from "being taught" to "learning" and the instructor's role from that of an "expert" to one of "collaborator" and "guide". Javid (2000) calls teachers as "coaches" and "facilitators". Strommen and Lincoln (1992) say that the teacher assumes roles such as "project manager" and "tutor" and becomes part of the team and not the heart of the classroom. In spite of an enormous amount of research on the interactions and roles of participants in a CSCL environment, Sims (1997) cautions us by saying that the dynamics of communication between the learner, instructor and the cognitive tool are as yet not fully understood. However it is clear from research that interactions between humans and machines take place at a physical as well at a cognitive level in a CSCL environment. Also the roles that participants assume are much more varied and complex in these learning environments. Cerratto and Belisle (1995) say, *"With the functionalities afforded by new networked technologies, there is now the potential for students to share their learning experiences with each other and also interact more dynamically with their tutors." (p.1).* Just who is the tutor and who is the learner in a CSCL environment? This paper explores models of participant interactions that surfaced and the roles of each participant in a Course-On-Line, Masters of Instructional Technology Programme in the University of Malaya.

The KOL Course, Sample and Data

The Course-On-Line or *Kursus-On-Line* (KOL) ran for 14 weeks, that is one Semester. The course content focus was the integration of information technology in instruction. The instructor (also the author), used the University of Malaya's template (***http://mdc.um.edu.my:88/mdc/mainmenu.nsf***) for all KOL courses which can be classified as the Content and Support Model if based upon Mason's (1998) models of existing on-line courses. The instructor was directed to teach basic skills of word processing, presentation graphics, databases and how to use these skills in their training sessions. The problem that faced the instructor was that the seven adult learners were from professions that were profoundly different and transfer of knowledge efficiently in a direct manner to such a diverse audience was difficult. Hence, although the course content was planned and executed as wanted by the administration, the issues of learning theories and human-computer interaction was introduced by the instructor to provide a more wholesome view. The KOL was a class based upon synchronous as well as asynchronous interactions and deep cognitive engagement. Assessment was authentic. Class participation was emphasized and presentations were essential and assessed. In addition, the learners were asked to prepare a Glossary of terms learnt throughout the course as well as to keep a personal journal, which was assessed. The author wanted to identify and describe how adult learners perceived the dynamic interactions that were occurring during the 14 weeks of class and how these interactions affected participant roles. The discussion in this paper emerged from data acquired from the instructor's observations and conversations with the learners, which was kept as a personal journal. Data was also taken from the learners' journals.

Models of Participant Interactions: Perceptions of Learners

The prevalent interactions in the KOL class were perceived in different ways by the 7 adult learners. These ideas were revealed during one of the conversations with the learners in week 11, when they were requested to draw how they visualized the interactions that were going on between the various participants in the room. Each learner had constructed his or her owns conceptions and will be discussed in turn.

Case 1: Han

Han, from the Ministry of Education drew an interesting general cycle of interaction model (Figure 1). The interaction between the learner and the computer and between the learner and the instructor was intense. This interaction was mainly in verbal form in the classes and also via e-mail at other times. In his Week 1 journal entry

Han states, "*... I guess most of us including the lecturer have somehow benefited from the discussions*". In Han's view, the interaction between the instructor and the computer apparently is not as intense and involved mainly input of course materials on the web.

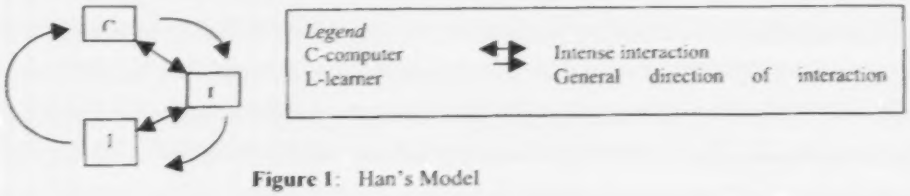

Figure 1: Han's Model

Case 2: Sham

Sham's (from the electronics field) perception is shown in Figure 2. Although her general idea was generally cyclical, the learners had various phases (1 to 4) of interaction with the computer. Phase 1 was interacting with the computer, to read, explore and understand the content provided. This was followed by phase 2 where she interacted with the computer in writing, thinking and rewriting the presentation that she had to prepare each week. At this phase she is also interacting with other members of her group via the email. Phase 3 she says was the most enjoyable as she and the computer added graphics and colour to make her presentations interesting. The last phase (phase 4) was during the weekly class discussions. Here she drew a sub cycle to show intensive interaction, between her, her peers, the instructor and the cognitive tool (the computer).

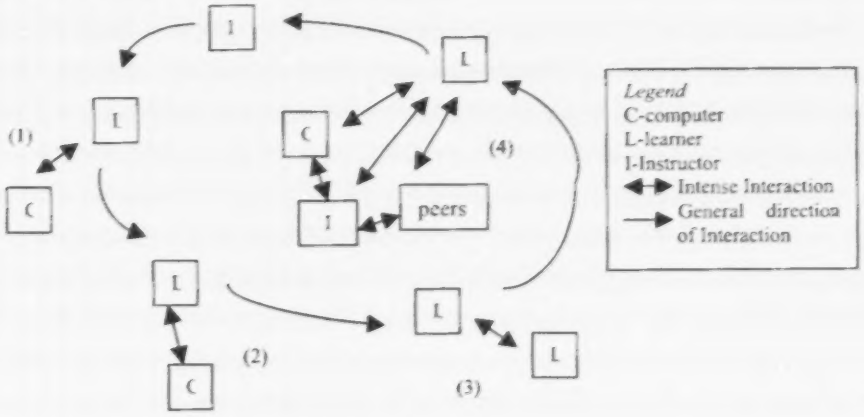

Figure 2: Sham's Model

Cases 3, 4 and 5: Dura, Afie and Una

These three learners' models although interviewed separately, were exactly the same as shown in Figure 3. Una was involved in human resource development and Dura and Afie were involved in the preparation of courseware for instruction with no prior experience with learning theories or human-computer interaction. According to them there was very straightforward intense interactivity between all three participants in a cyclical manner. Once again the vehicle of communication was verbal (one-to-one and group discussions) and via the e-mail.

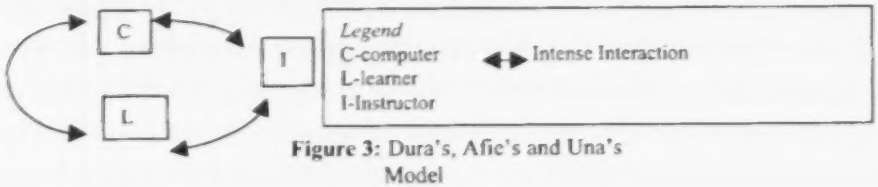

Figure 3: Dura's, Afie's and Una's Model

Case 6: Yang

Yang was involved in IT training such as word processing, presentation graphics and such, with no background in learning and instructional processes. Her model is shown in Figure 4.

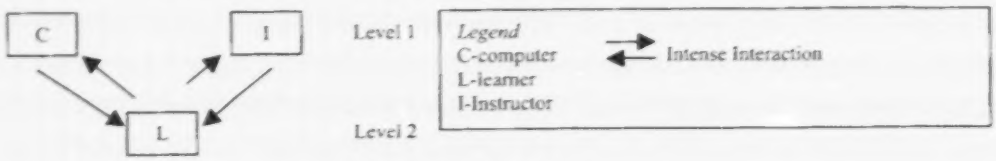

Figure 4: Yang's Model

Yang's idea was that there were two levels. Level one saw the instructor and the computer as equals. The learner was in level two. The interaction between the computer and the learner was one of receiving information and preparing presentations. Whereas the learner interacted through conversations and e-mail with the instructor and learnt through the feedback received. Strangely, according to Yang the interaction between the instructor and the computer was not apparent.

Case 7: Nas

Nas was from the Malaysian national automobile industry. His idea of a parallel model was unique (Figure 5).

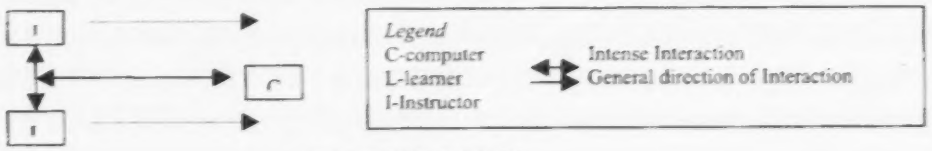

Figure 5: Nas's Model

Nas felt that the instructor and learner interaction progressed on parallel roads in the teaching-learning process. The computer was the mediating factor in this instructor-learner interaction.

The interaction models described above can be grouped into three main classes, namely cyclical, hierarchical and parallel. The Cyclical Model (Cases 1,2,3,4, and 5) has four important characteristics namely (i) there exists a general cyclical interactivity between the three main participants in a CSCL environment as shown in Cases 1,2, 3, 4 and 5, (ii) generally there seems to be more intense interactivity between the learner and the instructor, between the learner and the computer when compared with the instructor and the computer (Case 1), (iii) the interactivity between learner and computer seems to take place in phases (Case 2), and (iv) during class discussions and presentations, there occurs intense interactivity (high cognitive engagement) between learner and instructor, between learner and computer, between instructor and computer, between learner and peers, between peers and instructor and between instructor and peers (Case 2). The Hierarchical Model (Case 6) portrayed a more traditional setting. Yang gave equal importance to the computer and the instructor and both were placed at a higher level than the learner. When questioned as to why she perceived the participant interactions as such she said, *"The computer to me presented the content. You gave the human communication necessary. Without the instructor, the learner cannot be motivated"*. Hence the hierarchy in her eyes. The interactivity between the instructor and learner and between the learner and computer is evident. Interactivity between the instructor and the computer was apparently not perceived at all, perhaps because the instructor puts up the learning materials on the web before the start of the class to be accessed later by the students. The Parallel Model (Case 7) portrays the instructor and the learner being partners on the same path of constructing knowledge. It was a total opposite of the Hierarchical Model by Yang. Nas in his journal entry wrote, *"The inputs derived from the students would help the facilitator to enhance her knowledge and understand the student needs and expectation. The instructor is there, but did not make herself prominent. Learning was dynamic. Learners learnt from the instructor and vice versa. It has been an enriching experience for both."* Heath's (1997), stated that Computer Mediated Communication calls for a collaborative and group-oriented approach which encourages discussion, opinion sharing, reflection and debate. This kind of human-human communication is prominent in all three models perceived by the learners in this study.

Instructor, Learner and Computer roles in the KOL, CSCL Environment: Perceptions of learners.

Although conventional labels for the instructor such as *"facilitator" and "guide"* were given, several novel labels also emerged. Han described the instructor's role as one of *"provider of opportunities and democracy"*. He felt that the opportunities provided gave him freedom (sometimes too much he says) and control over his own learning. He also states that another role of the instructor was one of an *"authentic assessor"*. He says in his Week 2 entry, *"...In class tonight everyone took turns playing roles of recaller and listener."* When asked why "recaller", he explained that as presentations and discussions were taking place he had to recall what he had read and understood. Sham labeled the instructor as a *"disseminator of information"*, *"a model for constructivism"*, besides being a *"stimulator"*. Her perception was that the instructor placed large amounts of information via the net every week. Then by example lead them to how they can construct knowledge from the vast amount of information given. The encouragement given in class stimulated her to construct as deep a knowledge as possible. She writes in her journal, *"...she (the instructor) listened intently to our discussions and wrote down all the key points picked up from the presentations on the board. This later was constructed into the gist of the debate that went on."* Nas's labels were *"provider of guidance"*, *"a mediator"*, and *"social negotiator"*. When probed further apparently these roles assumed by the instructor made Nas feel comfortable and free, which triggered his intrinsic motivation. Yang also called the instructor *"a motivator"*. Dura's journal entries reflect a colourful picture of a journey. She wrote, *"...is the navigator, the others and I are sailors and we are going to cruise the tide together"*. Afie felt that the instructor was a *"key"*. When asked to explain he said, *"As a key to unleash creativity and communication"*. Una who was nearby agreed and said, *"My fear to try has been unlocked"*. Una in his journal also stated, *"Instead of telling us about the subject matter, we were given a situation and asked to reflect and discuss the pros and cons"*. Afie also felt that the instructor at times was like a *"host of a show"*. This was because the instructor had to facilitate and direct questions to the *"panel of experts"* (the learners) in the class. All the labels given to the instructor reflected similar thoughts found in Lerner (1997) and Javid (2000). The current ideas predominant about distributed and shared cognition between the instructor and learners also seemed to be implied here. The learners also felt that they were given a lot of control over their own learning. The instructor apparently stayed in the background, while stepping in at crucial times to steer the class.

Han described the computer as his *"late night companion"* who helped him to finish his presentations and assignments. Dura called her computer *"a friend"* with whom she interacts constantly. Sham labeled the computer as her *"assistant"*. It helps me to remember better". Afie said, *"the computer helps me to simplify things"*. Yang said, *"the computer presented content"*. She went on to say the computer *"made things flexible"*. All the learners called themselves *"readers"*, *"analysts"*, *"creators"*, *"sharers"*, *"critics"*, *sailors*, and *"collaborators"*. Clearly the above ideas discloses once again that the computer is a cognitive tool that essentially helps to intensify human-human interaction, as the presentation and direct transfer of information from the instructor to the learner becomes secondary and the construction and creation of knowledge utmost.

Conclusion

As the CSCL environment continues to evolve, the actors are as chameleons that adapt to roles to gain the utmost from the environment. Riel (1994) has rightly said that the role of the teacher would shift from being the prime source of knowledge to that of expertise in learning. He said, *"A good teacher should be an expert learner, who can facilitate students' learning and information seeking"*. Bannon (1989) stated that the computer besides being a tool, could also be a medium, which mediates collaboration with individuals. As a conclusion it can be said that this case study has uncovered some insights into how a diverse group of adult learners perceived interactions between participants in a CSCL environment and how they utilized this dynamic interaction to construct and create knowledge out of a colossal amount of information.

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